REMARKS AND ARGUMENTS

A. Claim Status

Claims 22-52 are pending in the application.
Claims 22-52 were rejected under 35 U.S.C. § 103 (a)

B. Amendments

Claim 34 has been amended to correct an incorrect translation.

C. Correction of Office Action

In a telephone conversation between the undersigned and the examiner on March 16, 2004, the examiner acknowledged that paragraph 2 on page 2 of the Office Action should begin: "Claims **22-52** are rejected . . . " and that the 14th line on page 3 should read " . . . the sample molecule (as recited in Claim **22**)". These claim numbers are presented correctly in the Office Action Summary.

D. Remarks

Claim 34 has been amended in order to correct an incorrect translation. The word "ultrasound" has been replaced by "supersonic". No new matter has been introduced.

Claims 22-52 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,338,931 to Spangler in view of Vora, U.S.Patent No. 5,053,343, and in further view of Knauer, U.S. Patent No. 4,935,623.

The MPEP, Section 2143, states the following:

> To establish a prima facie case of obviousness, three basic criteria must be met, First there must be some suggestion or motivation, either in the references themselves or in the

> knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Section 2141.02 states:

> The prior art reference must be considered in its entirety, i.e. as a whole, including portions that would lead away from the claimed invention.

Applicants respectfully submit that these rejections are not proper, because they are based on a misunderstanding of the scope of the present claims. Additionally, they are not proper because the inventions of the cited references are based on physical principles distinct from those of the current claims, and the references provide no motivation to one of ordinary skill to modify or combine them to produce the invention of Claim 22. Additionally, the references do lead away from the invention claimed in Claims 22-52.

1. The reference of Spangler, et. al.

The Spangler et al. reference (US 5 338 931) discloses an ion mobility mass spectrometer. For operating the mass spectrometer, electrically charged particles have to be prepared. This charging is obtained by the conventional method of photoionization. The photoionization is generated with a pulsed gas discharged lamp. The sensitivity and selectivity of the photoionization is increased by addition of an auxiliary substance.

The photoionization is not generated directly in the sample but rather indirectly by a photoionization of the auxiliary substance. Ionized auxiliary substance particles form electrically charged complexes with the sample particles. Ion-molecule-reactions within these complexes result in an electrical charging of the sample particles.

An essential feature of the conventional photoionization is the absorption of an energetic photon by a target particle (Spangler: auxiliary substance particle). As a result of this absorption, an electron is separated from the particle. Independent pairs of charge carriers are directly generated by the ionization process (one step). The disadvantage of this process is the relatively high amount of energy necessary for the ionization (about 10 eV per pair of charge carriers) and

the required generation of energetic photons. Compare with the present specification, p. 10, second and third paragraphs.

In contrast to the Spangler reference, claim 22 teaches the loading of a neutral cluster with at least one reaction partner, which forms at least one pair of electrically differently charge carriers with the substance in the cluster by a chemical charge transfer reaction. In contrast to the photoionization, the cluster remains neutral. In fact, the cluster comprises ions, which are not yet usable after the charge transfer reaction. After the fragmentation of the cluster the charge carriers are separated. Accordingly, claim 22 defines a process with two steps wherein the ions are obtained after the second step of fragmentation only. One advantage of this process is that energetic photons are avoided; the chemical and mechanical energies can be used more effectively (see in particular specification, page 10, par. 2).

It is to be emphasized that Spangler et al. do not disclose a two-step process. The use of the auxiliary substance, which is ionized and subsequently ionizes the sample substance, is completely different compared with the reaction partner recited in the invention of Claim 22. According to Spangler et al. the ionization of the complex is obtained with the first step, when the auxiliary substance is ionized. Subsequently, the charge carrier is transferred to the sample substance. On the contrary, the present invention teaches the production of two reaction products with opposite charges by a chemical reaction from neutral reaction partners.

Furthermore, it is important to emphasize that present claim 22 defines two alternatives for producing the pair of electrically differently charged charge carriers, either spontaneously or excited from the outside. Again, this excitation from the outside is not comparable with the photoionization disclosed by Spangler et al. leading directly to free charged particles. See present specification, p. 7, first paragraph.

Applicants respectfully submit that the induced dipole interaction between a charged particle and a neutral particle, discussed on page 3 of the office action, line 14, has no connection with the method recited in Claim 22. An electrically charged particle is capable of inducing an opposite partial charge in a neutral particle. However, this induction does not represent a charging of the neutral particle because on the other side opposite to the electrically charged particle a counter charge is induced having the same amount as the induced partial charge. Therefore, the interaction discussed by the examiner converts a neutral particle into a neutral dipole only. However, this does not lead to the provision of electrically charged pairs of particles as defined in claim 22.

Finally, the technique of Spangler et al. is not capable of implementing the method of claim 22. Spangler et al. do not disclose any devices for generation or fragmentation of clusters. In addition, Spangler et. al. lead away from the use of alkali atoms (col. 1, lines 44 - 49), in contrast to present Claim 30 and present specification, p. 8, lines 6 - 13.

Therefore, there is no motivation in the Spangler reference for the invention of Claim 22 and for all present dependent claims.

2. The reference of Vora, et. al.

The Vora reference (US 5 053 343) discloses an ion source to be applied in an ion mobility mass spectrometer. Claim 1 of Vora et. al. recites ". . . positioning an electrolytic ionization source consisting essentially of an electrolyte in a reaction region; heating said electrolyte to generate reactant cations; . . . ". The ionization is generated on a heated surface, which may carry additional substances as well as the sample to be analyzed. Vora et al. describe two ionization channels: Firstly, a high surface temperature can yield a thermal ionization. Thermal ionization comprises a thermoionic emission of positive and negative charge carriers. These charge carriers are capable of charging the sample substance by association or ion-molecule reactions. With regard to the thermoionization, the corresponding arguments are true like in the case of photoionization (see Spangler et al.). Secondly, ionization can be obtained by the conventional surface ionization as a result of the contact of the sample substance with the doped and heated surface. Again, the surface ionization is a one-step ionization like the thermoionization or photoionization.

One particular advantage of the invention of Claim 22 compared with the Vora et al. technique can be seen in the fact that any external heating (heating of the surface) can be avoided with the claimed method. In this connection, it is noteworthy that Spangler et. al. teach away from the use of heaters at col. 1, lines 49 - 52.

Vora et al. are silent with regard to any cluster generation or cluster fragmentation.

As in the case of Spangler et al., the Vora et al. apparatus is not capable of implementing the method recited in Claim 22.

For all of these reasons, the method claimed in the Vora reference is based on physical principles distinct from those recited in Claims 22-52. This reference provides no motivation for one skilled in the art to conceive the method recited in the present claims.

3. The reference of Knauer, et. al.

The Knauer et al. reference (US 4 935 623) represents technological background with regard to the generation of neutral atoms by fragmentation of electrical charged high energetic clusters only.

In contrast to the Knauer et al. technique, the claimed procedure defines the generation of electrically charged particles. Furthermore, neutral clusters are fragmented with the claimed method in contrast to the fragmentation of charged, high energetic clusters of Knauer et al..

According to the invention of Claim 22, the cluster is used as a reaction environment for an efficient technical charged transfer reaction. On the contrary, Knauer et al. use the clusters for the acceleration of atoms only.

4. Summary

The present invention, recited in Claims 22-52, is based on chemical charge transfer reactions in neutral clusters. This represents a completely different concept compared with the one-step-ionizations disclosed in prior art. Claims 22-52 are based in particular on the finding of the inventors that such chemical charge transfer reactions can be obtained with particle densities comparable with the condensed phase only. These particle densities have been obtained in the neutral clusters used in the invention of Claims 22-52. On the other hand, these clusters allow a fragmentation with the intended charge separation. This result can be obtained because the clusters also have a gas phase character.

The present concept of using solid phase properties and gas phase properties of molecular clusters was neither disclosed nor suggested in any of the prior art documents.

Based on the previous arguments, applicants respectfully submit that these three references, both individually and combined, do not provide suggestion or motivation to one of ordinary skill in the art to modify the references or to combine reference teachings to make the invention of Claims 22-52. The inventions of these references are based on physical principles distinct from those of Claims 22-52 and they teach away from Claims 22-52.

E. Conclusions

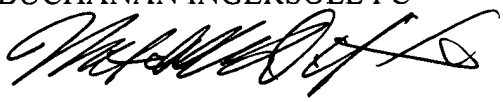
Applicants believe that the foregoing amendment and remarks have overcome or rendered moot all grounds for rejection and objection, and that the application is in a condition for allowance. Applicants therefore respectfully request prompt action on the claims and allowance of the application. If the Examiner believes that personal communication will expedite prosecution of the application, the Examiner is invited to telephone Applicants' undersigned agent directly.

AUTHORIZATION AND PETITIONS

Applicants believe that no extension of time is required to make submission of the response timely. However, in the event that an extension of time is required, Applicants hereby submit a petition for such extension of time as may be necessary to make this response timely. The Commissioner is hereby authorized to charge any necessary additional fees for extension of time or additional claims to deposit account No. 502194. A duplicate of this Authorization is enclosed.

Respectfully Submitted,

BUCHANAN INGERSOLL PC



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